What's Language Got to Do With It?

A Panel Presentation

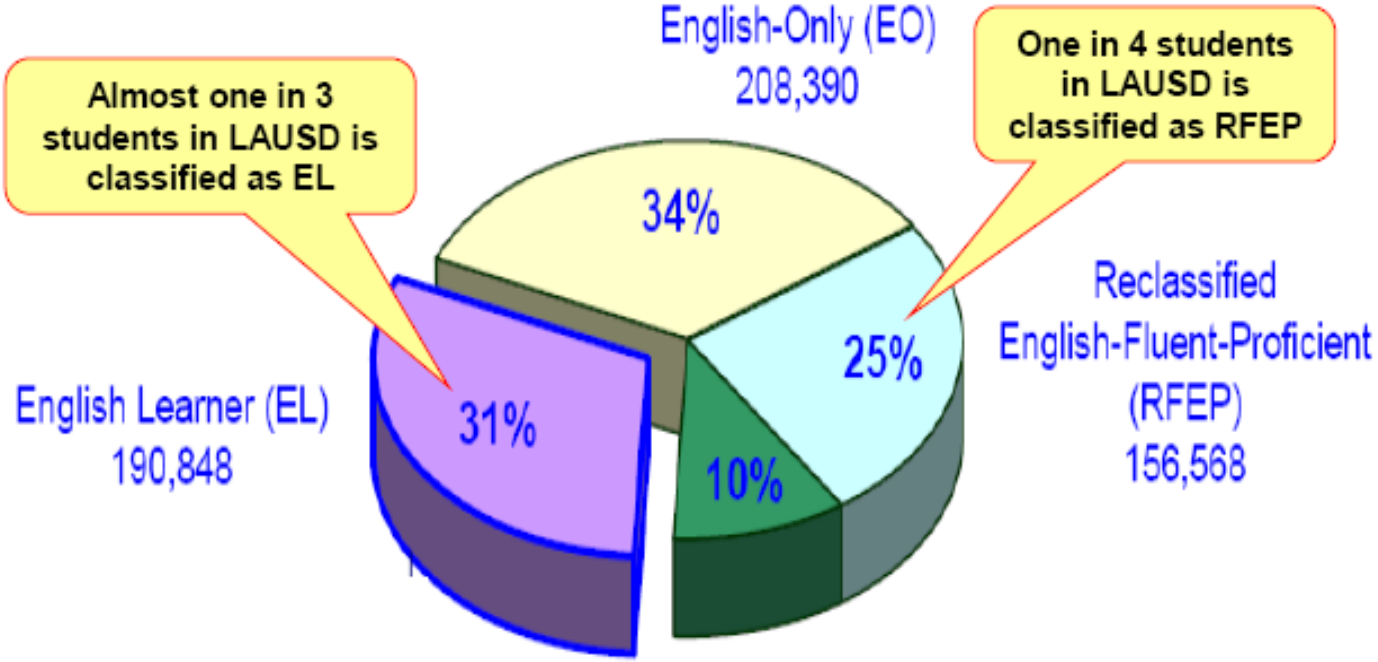
Snapshots of Secondary Mathematics for English Learners in Los Angeles Unified School District

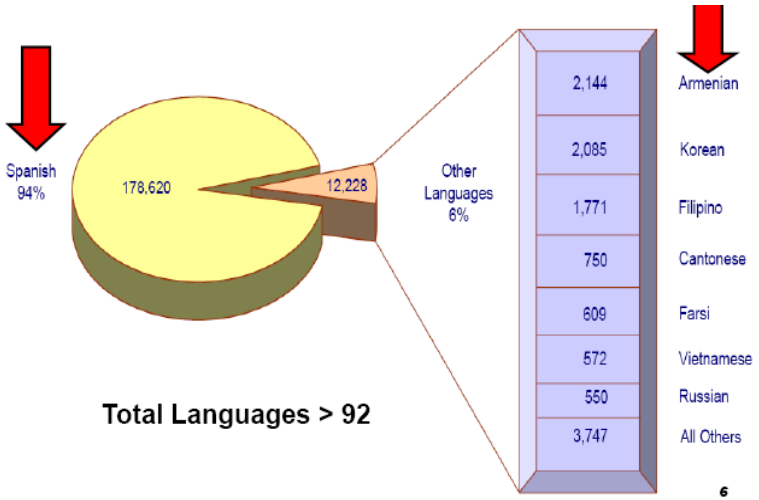
Presented for the 2012 **MaTHink Conference,** Region X Algebra Forum

Setting the Context

- 1,235 Schools/Centers
- >664,000 K-12
- City of Los Angeles & 31 small cities
- 73.4% Latino
- 10% African American
- EL: >92 Languages
- SEL: Pacific Islander, Native American, Chicano-American, African American

ELD is a LAUSD Priority





Total Languages > 92

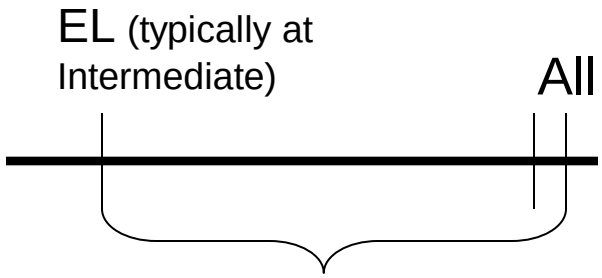
Secondary Findings: 2010 "Reparable Harm" Report

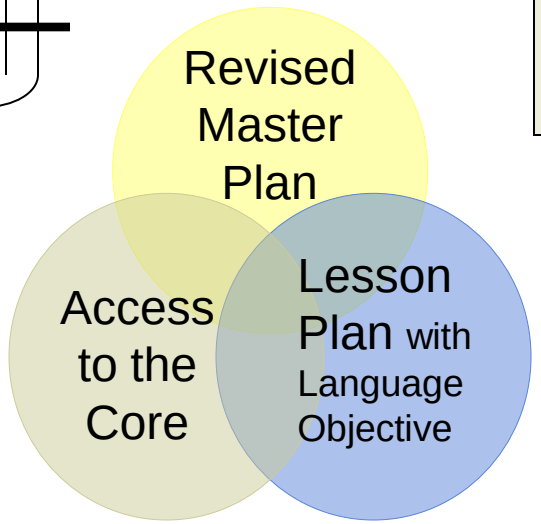
LAUSD Contributions to the Study

Middle Schools:

- 25% of these students do not always fully understand the language of textbooks
- These students have trouble with "big words," long stories, dense texts, and vocabulary
- 75% of these students have a current overall CELDT level of 3
- 41.6% of these students had been retained one grade level
- Only one of these students does not intend to go to college and two are not sure

Math/ELD Gains Urgently Needed





Over the past 6 years, SWD gained only 1.6% P/A in K-12 CST mathematics in LD 6

In the same time period, ELs %P/A improved only 0.8 pts.

Title III – AMAO 3 (Math)

ELs will meet the Adequate Yearly Progress (AYP) performance target of Proficient or Advanced

Year	State Target	LAUSD
2008-09	45.5%	36.3%
2007-08	34.6%	34.1%
2006-07	23.7%	30.4%

17

2010 & 2011 LAUSD EL Gr. 6-8 Math % P/A vs. AMO target	22.9% vs.58% & 23.3% vs. 68.5%
2010 & 2011 LAUSD EL Gr. 10 Math % P/A vs. AMO target	26.1% vs. 54.8% 29% vs. 66.1%

Secondary Findings: 2010 "Reparable Harm" Report

LAUSD Contributions to the Study

Middle Schools:

- A total of 24 students fitting the LTEL designation were interviewed
- All students interviewed have been ELs for a period ranging from 7 to 11 years
- Only one of these students was born outside the United States
- In 41.6% of these students' homes, Spanish is the only language spoken
- 87.5% of these students speak English with their friends
- All of these students think that English is part of their identity

Secondary Findings: 2010 "Reparable Harm" Report

LAUSD Contributions to the Study

High Schools:

- A total of 24 students fitting the LTEL designation were interviewed
- All 24 students have been designated ELs for a period of 9 to 13 years
- 50% of these students had been retained one grade level
- 8.3% of these students were born outside the United States
- In 2.1% of these students' homes, Spanish is the only language spoken

Secondary Findings: 2010 "Reparable Harm" Report

LAUSD Contributions to the Study

High Schools

- Only one of these students does not think that English is part of his/ her identity
- 25% of these students do not always fully understand the language of textbooks
- These students have trouble with "big words," long stories, dense texts, and vocabulary
- 62.5% of these students' current overall CELDT is 3; however, most score 3s and 2s in Reading and Writing
- 100% of these students speak English with their friends, but only 2.1% prefer Spanish over English

LAUSD Definition of LTEL

English Learners who have been in US schools for 6 or more years with no more than one year of interrupted schooling, have not reclassified, and are scoring at Intermediate or above on the California English Language Development Test (CELDT), and Below Basic (BB) or Far Below Basic (FBB) on California Standards Test (CST) in English Language Arts (ELA).

Long Term English Learners (LTEL)

LAUSD DATA Long Term English Learners 2009-10			
Grade	LTELs	%	Total Enrollment
5	465	4.2%	11075
6	2934	36.0%	8143
7	4070	47.6%	8547
8	4399	49.6%	8874
9	4826	35.1%	13762
10	3234	35.2%	9194
11	2549	39.1%	6512
12	1961	36.5%	5377
Total	24438	34.2%	71484

Panel Presenters

- ***SITE***

Roberta Ross, Mathematics Coach, Huntington Park High School, Local District 6, LAUSD

- ***LOCAL DISTRICT***

Roslyn Chambers, Mathematics Coach, Local District 8, LAUSD

- ***PARTNER***

Dr. Gretchen Laue, U.C. San Diego, CaMSP Grant, Local District 6, LAUSD

Facilitator & Presenter on RtII Lens: Lisa Usher-Staats, LD 6, LAUSD

EL Access to Algebra I Proficiency: Huntington Park High School

- Snapshot shared by: Roberta Ross, Mathematics Coach, HPHS, LD 6, LAUSD

Traditional Teaching

"Just a darn minute! — Yesterday you said that X equals **two**!"

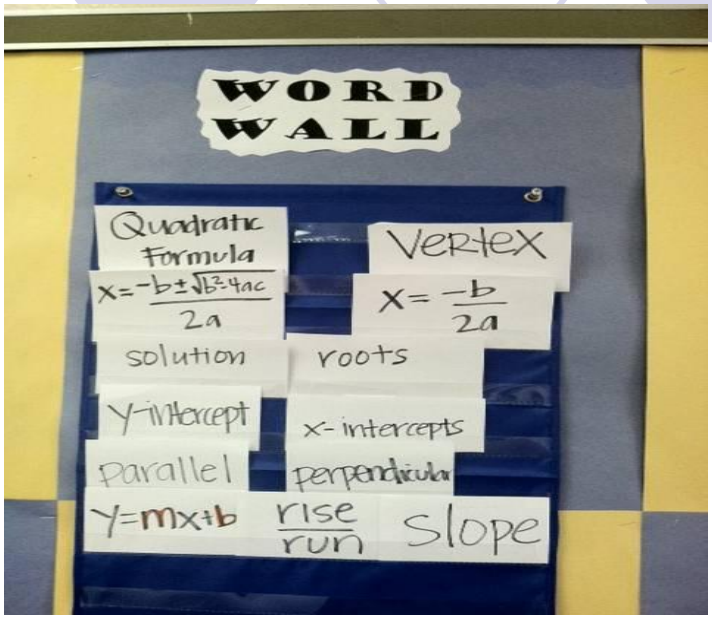
- Teacher-led
- Lecture-based
- Students are given information
- Procedural in nature
- Little application
- Discrete unrelated topics
- Few opportunities for talk-time

Language in the Mathematics Classroom

A School-Site Perspective

Huntington Park High, LAUSD

Attention to Academic Vocabulary



- Word Walls
- Math Dictionaries

Word	Def.	Picture	Ex.	Ref.

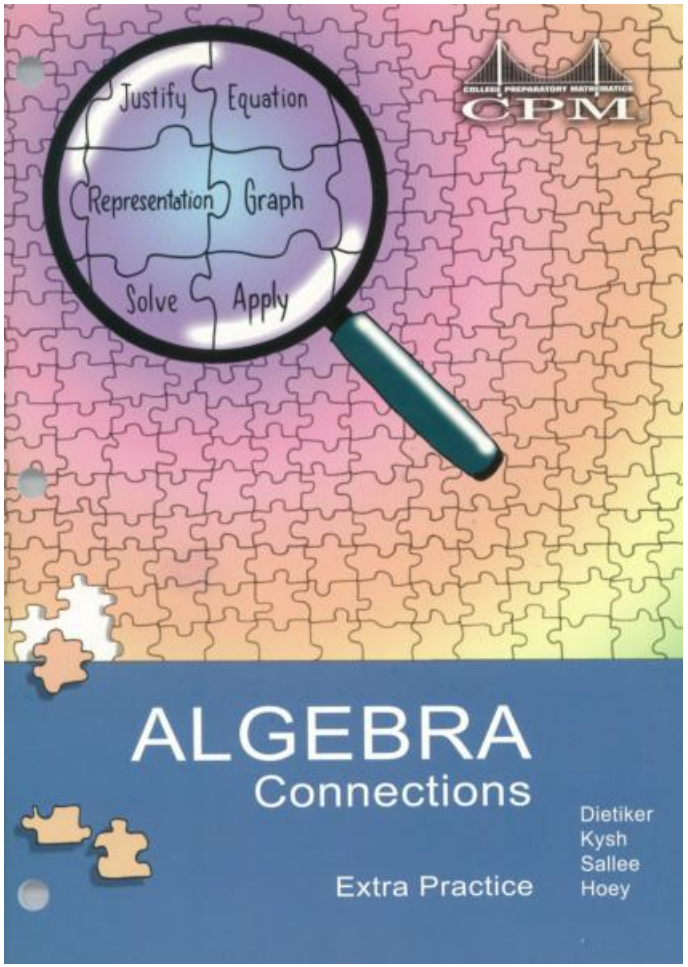
Traditional Teaching

"Just a darn minute! — Yesterday you said that X equals **two**!"

- Teacher-led
- Lecture-based
- Students are given information
- Procedural in nature
- Little application
- Discrete unrelated topics
- Few opportunities for talk-time

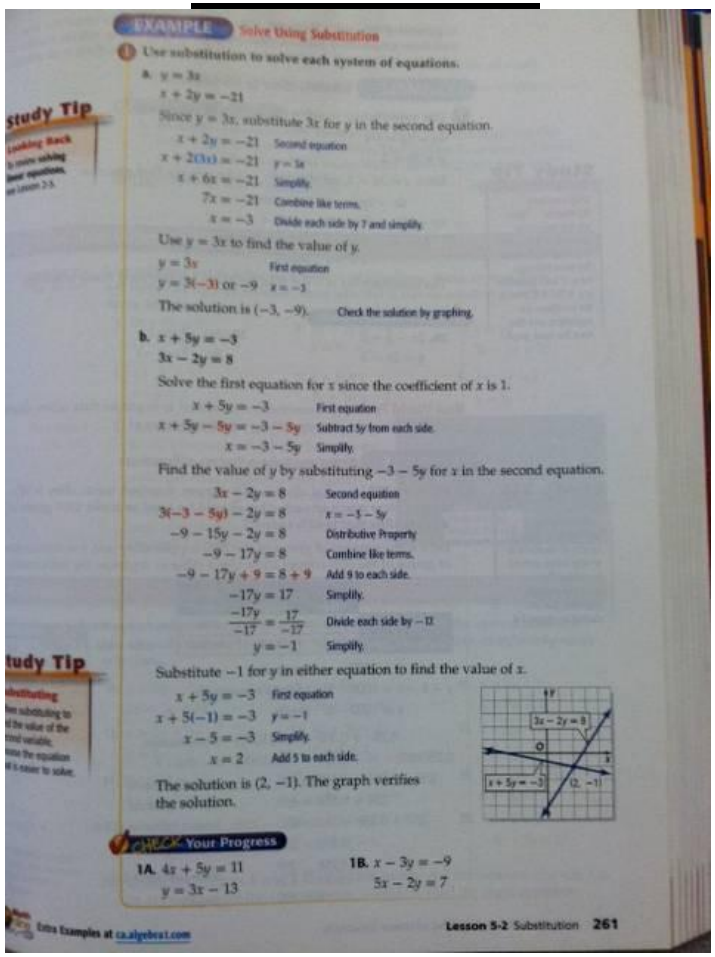
Meaning in Mathematics

- Cooperative learning
- Problem-based
- Math in context
- Inter-related topics
- Students construct understanding through questioning
- Student talk-time
- Spiral review



Text Comparison

Traditional



EXAMPLE Solve Using Substitution

1 Use substitution to solve each system of equations.

a. $y = 3x$
$x + 2y = -21$

Since $y = 3x$, substitute $3x$ for y in the second equation.

$x + 2y = -21$ Second equation
$x + 2(3x) = -21$ $y = 3x$
$x + 6x = -21$ Simplify.
$7x = -21$ Combine like terms.
$x = -3$ Divide each side by 7 and simplify.

Use $y = 3x$ to find the value of y.

$y = 3x$ First equation
$y = 3(-3)$ or -9 $x = -3$

The solution is $(-3, -9)$. Check the solution by graphing.

b. $x + 5y = -3$
$3x - 2y = 8$

Solve the first equation for x since the coefficient of x is 1.

$x + 5y = -3$ First equation
$x + 5y - 5y = -3 - 5y$ Subtract $5y$ from each side.
$x = -3 - 5y$ Simplify.

Find the value of y by substituting $-3 - 5y$ for x in the second equation.

$3x - 2y = 8$ Second equation
$3(-3 - 5y) - 2y = 8$ $x = -3 - 5y$
$-9 - 15y - 2y = 8$ Distributive Property
$-9 - 17y = 8$ Combine like terms.
$-9 - 17y + 9 = 8 + 9$ Add 9 to each side.
$-17y = 17$ Simplify.
$\frac{-17y}{-17} = \frac{17}{-17}$ Divide each side by -17.
$y = -1$ Simplify.

Substitute -1 for y in either equation to find the value of x.

$x + 5y = -3$ First equation
$x + 5(-1) = -3$ $y = -1$
$x - 5 = -3$ Simplify.
$x = 2$ Add 5 to each side.

The solution is $(2, -1)$. The graph verifies the solution.

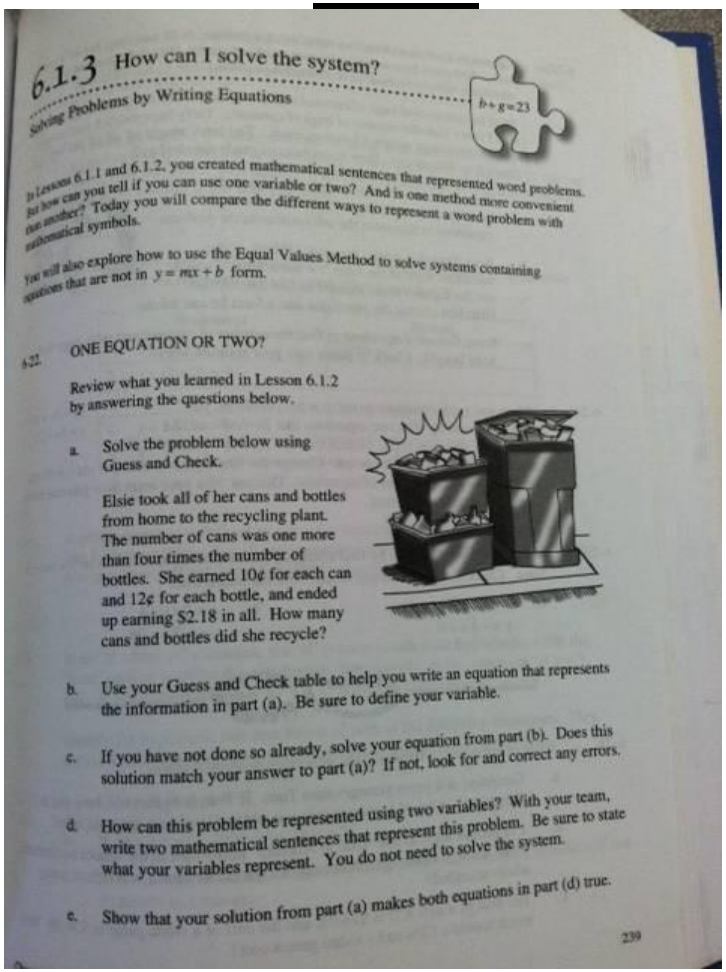
Check Your Progress

1A. $4x + 5y = 11$
$y = 3x - 13$

1B. $x - 3y = -9$
$5x - 2y = 7$

Extra Examples at ca.algebra1.com

CPM



6.1.3 How can I solve the system?

Solving Problems by Writing Equations

In Lessons 6.1.1 and 6.1.2, you created mathematical sentences that represented word problems. But how can you tell if you can use one variable or two? And is one method more convenient than another? Today you will compare the different ways to represent a word problem with mathematical symbols.

You will also explore how to use the Equal Values Method to solve systems containing equations that are not in $y = mx + b$ form.

6-22. ONE EQUATION OR TWO?

Review what you learned in Lesson 6.1.2 by answering the questions below.

a. Solve the problem below using Guess and Check.

Elsie took all of her cans and bottles from home to the recycling plant. The number of cans was one more than four times the number of bottles. She earned 10¢ for each can and 12¢ for each bottle, and ended up earning $2.18 in all. How many cans and bottles did she recycle?

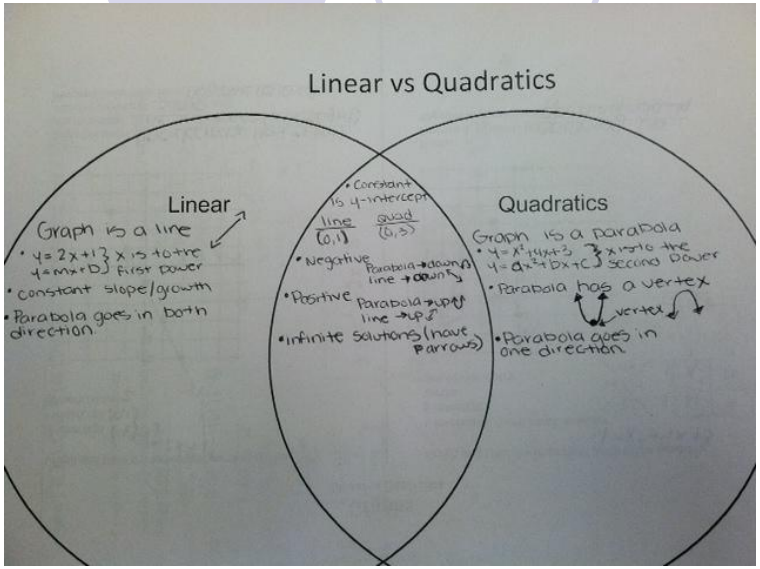
b. Use your Guess and Check table to help you write an equation that represents the information in part (a). Be sure to define your variable.

c. If you have not done so already, solve your equation from part (b). Does this solution match your answer to part (a)? If not, look for and correct any errors.

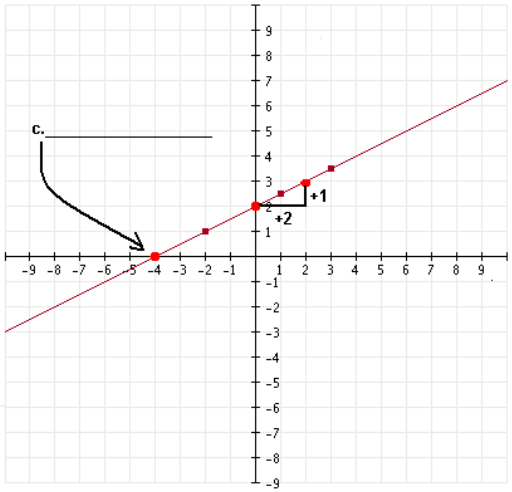
d. How can this problem be represented using two variables? With your team, write two mathematical sentences that represent this problem. Be sure to state what your variables represent. You do not need to solve the system.

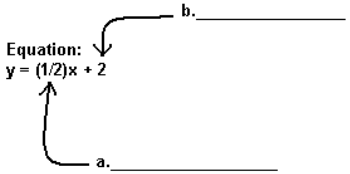
e. Show that your solution from part (a) makes both equations in part (d) true.

Attention to Academic Vocabulary



. Use the following words to fill in the blanks.





- Instructional Strategies
- Assessing Vocabulary

Making Connections

Try this…

Using Data & Access to the Core in Local District 8

- Snapshot created by: Odette Board, RtII Expert, LD 8, LAUSD & shared by Roslyn Chambers, Instructional Coach, Washington Preparatory High School, LD 8, LAUSD

The Language of Math

It's Purpose and Potential

What is "The Language of Math?"

Who?

When?

Why?

How?

The Language of Math

It's Purpose and Potential

What?
Translate
Content Vocabulary
Explanations
Justifications
Connections
Questions
Prior Knowledge
"It's LEARNING"

Who?
ALL
students

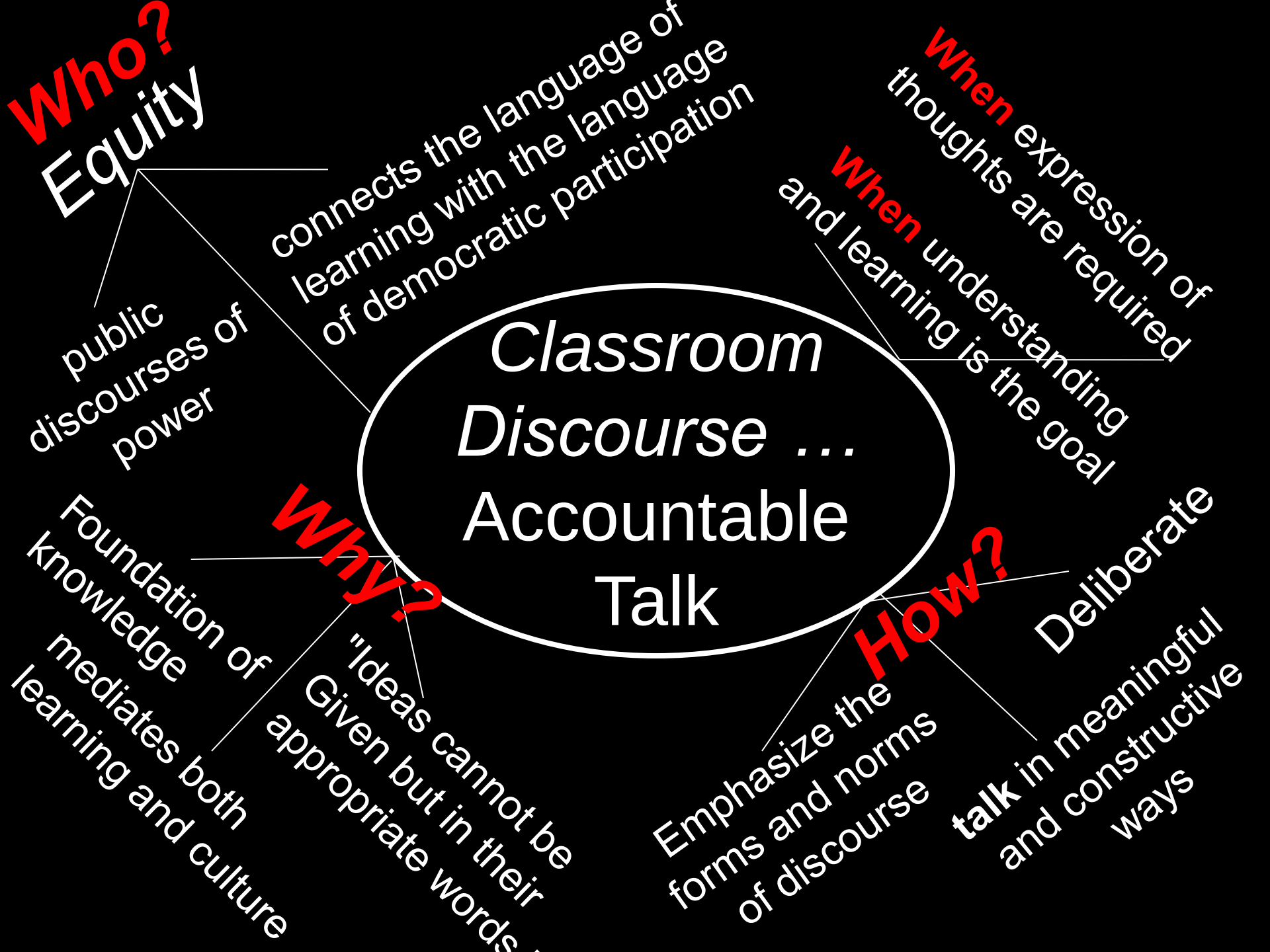
When?
The
Whole
Lesson

Why?
Making
connections

How?
Rigorous
Group
Tasks

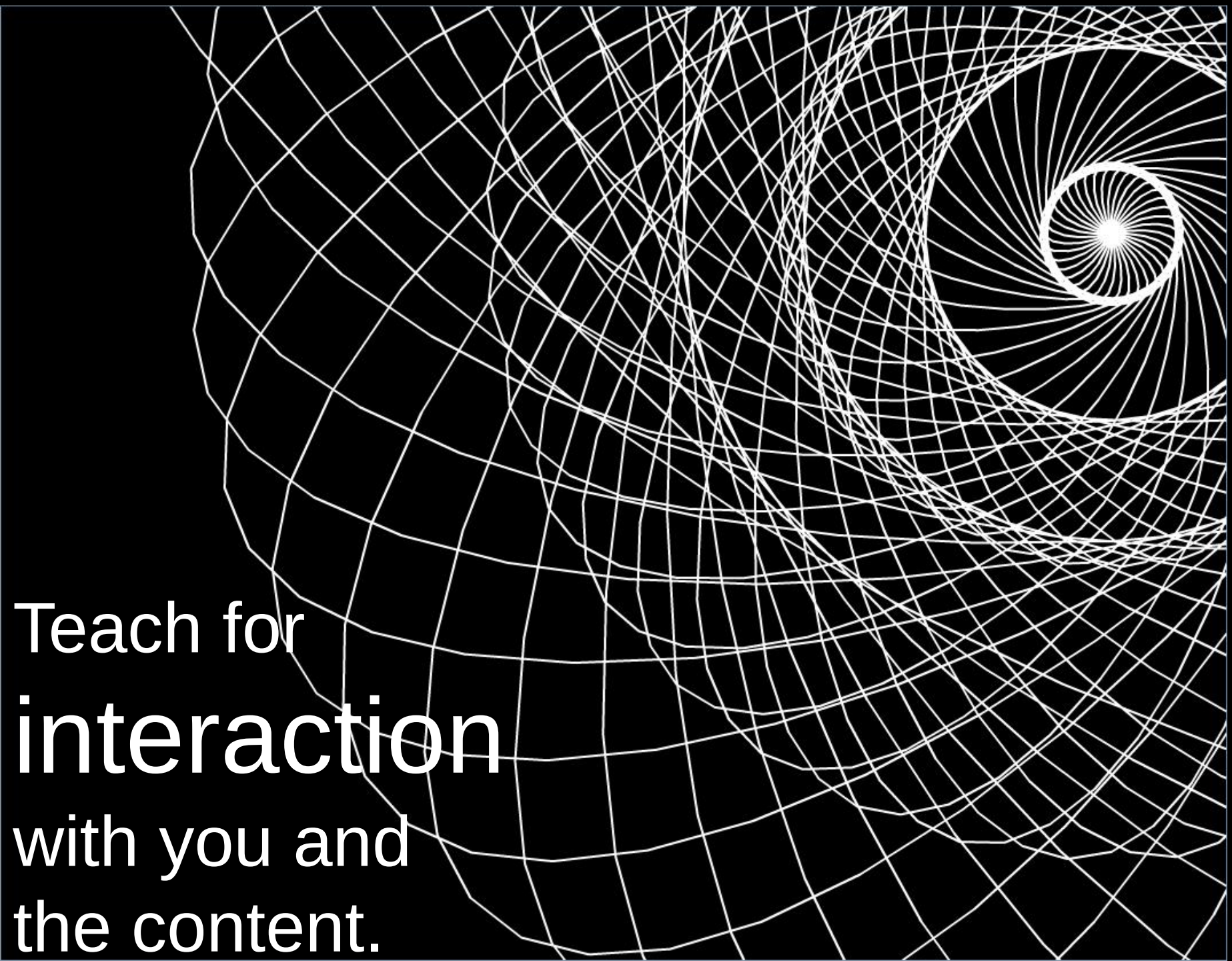
The Language of Math

It's Purpose and Potential


Who?
Equity
public discourses of power
connects the language of learning with the language of democratic participation
When expression of thoughts are required
When understanding and learning is the goal
Classroom Discourse … Accountable Talk
Why?
Foundation of knowledge
mediates both learning and culture
"Ideas cannot be Given but in their appropriate words
How?
Emphasize the forms and norms of discourse
Deliberate
talk in meaningful and constructive ways

Three ideas

Increase instructional consistency.


Teach for
interaction
with you and
the content.

Teach for metacognition.

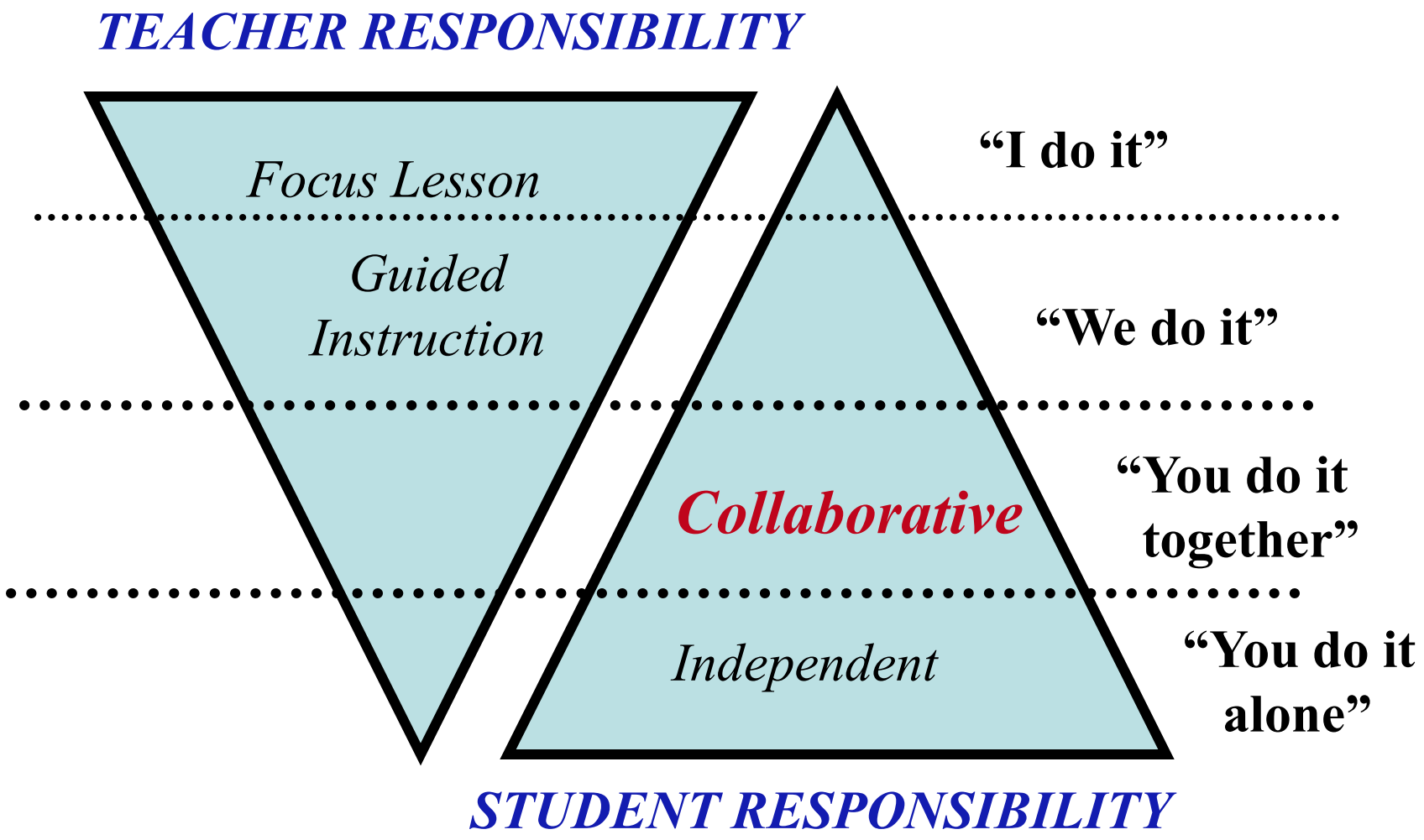
Tomorrow's Purposes

Teach the skills students need for the 21st century.

Identify quality indicators of effective instruction.

Use quality as a method for conducting instruction.

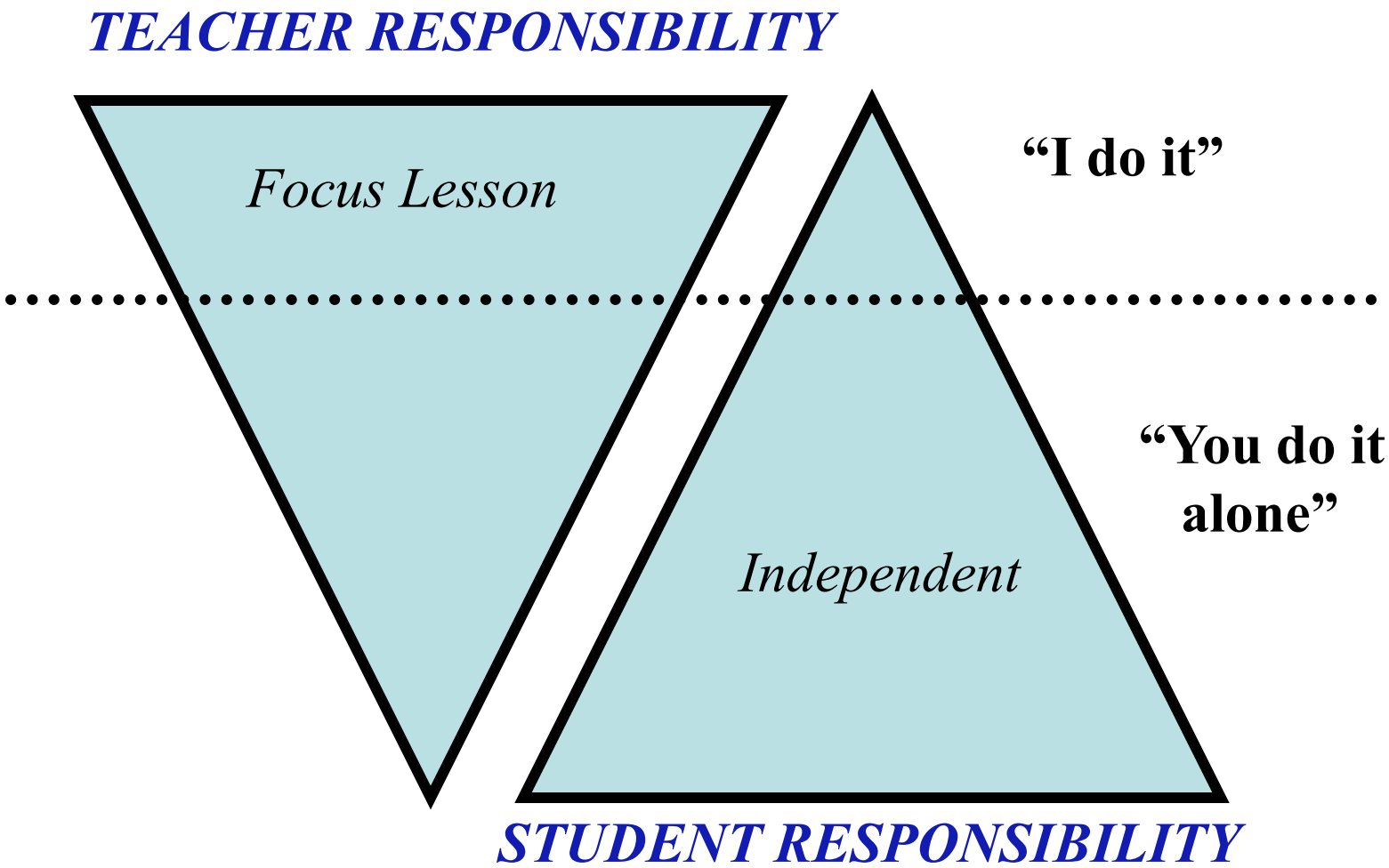
The First Idea: Increase instructional consistency.



A Model for Success for All Students

Fisher, D., & Frey, N. (2008). *Better learning through structured teaching: A framework for the gradual release of responsibility.* Alexandria, VA: Association for Supervision and Curriculum Development.

The sudden release of responsibility

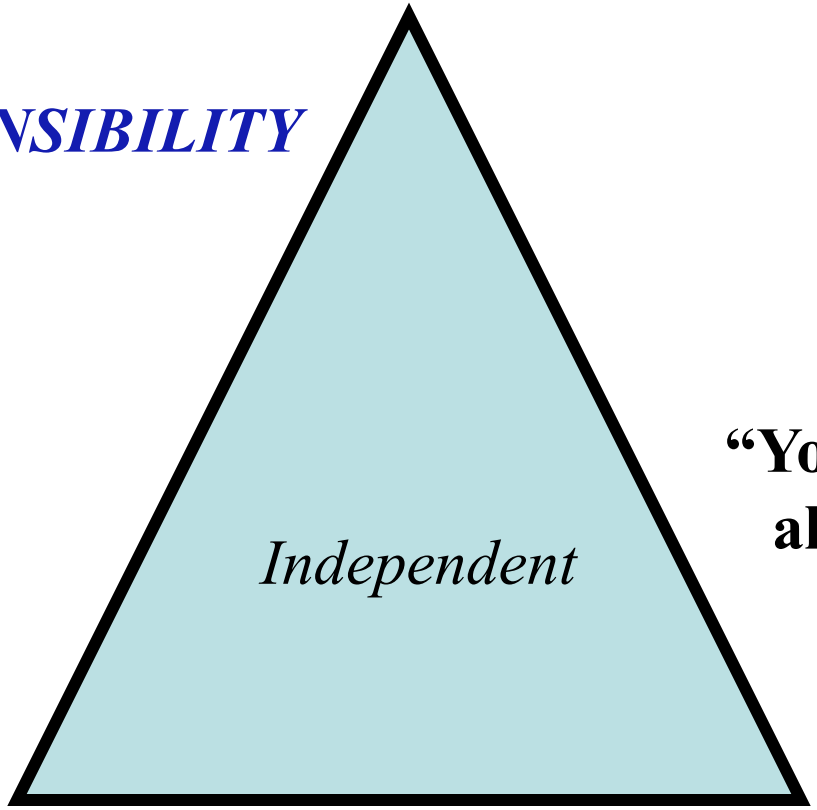


Fisher, D., & Frey, N. (2008). *Better learning through structured teaching: A framework for the gradual release of responsibility.* Alexandria, VA: Association for Supervision and Curriculum Development.

DIY School

TEACHER RESPONSIBILITY

(none)

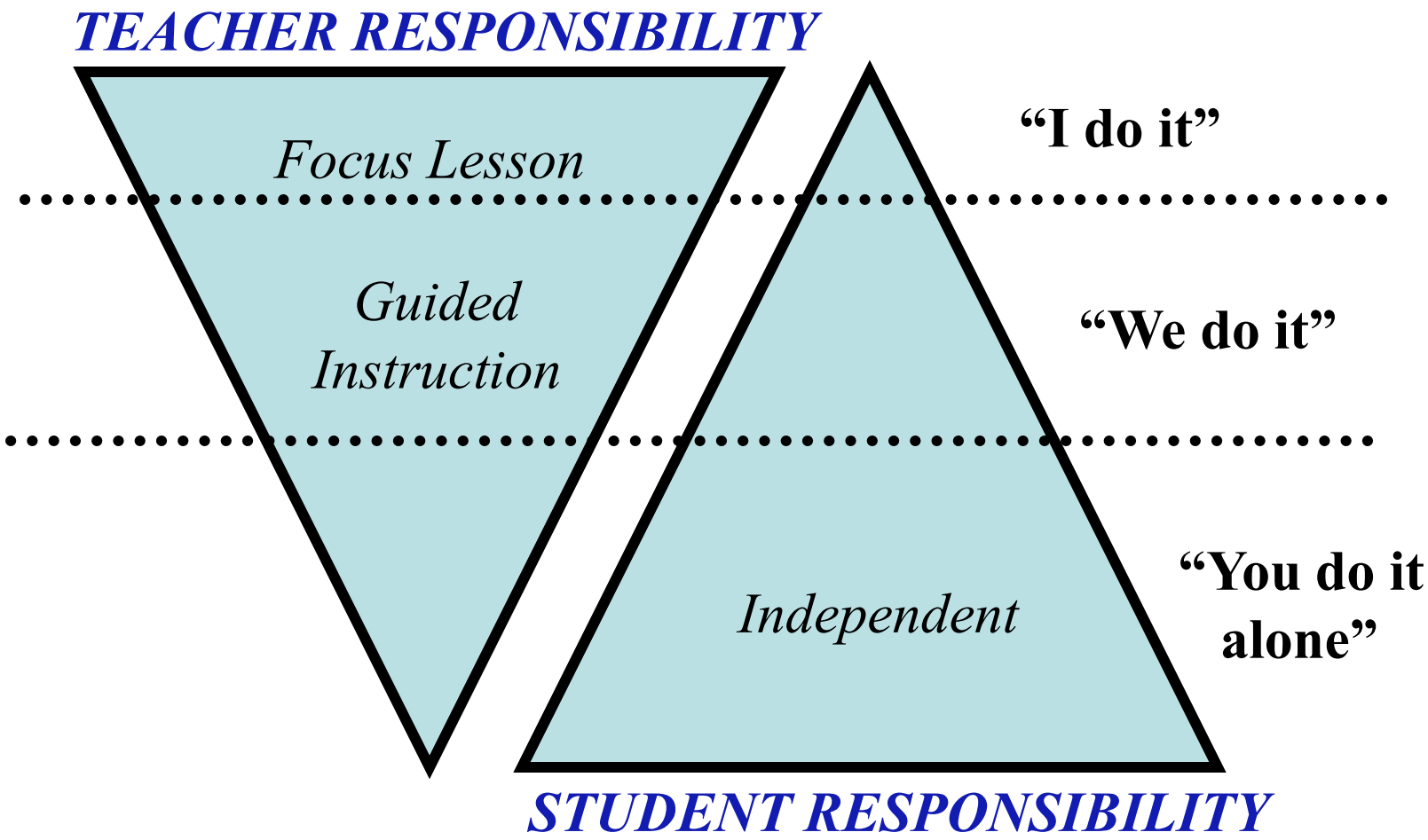


"You do it alone"

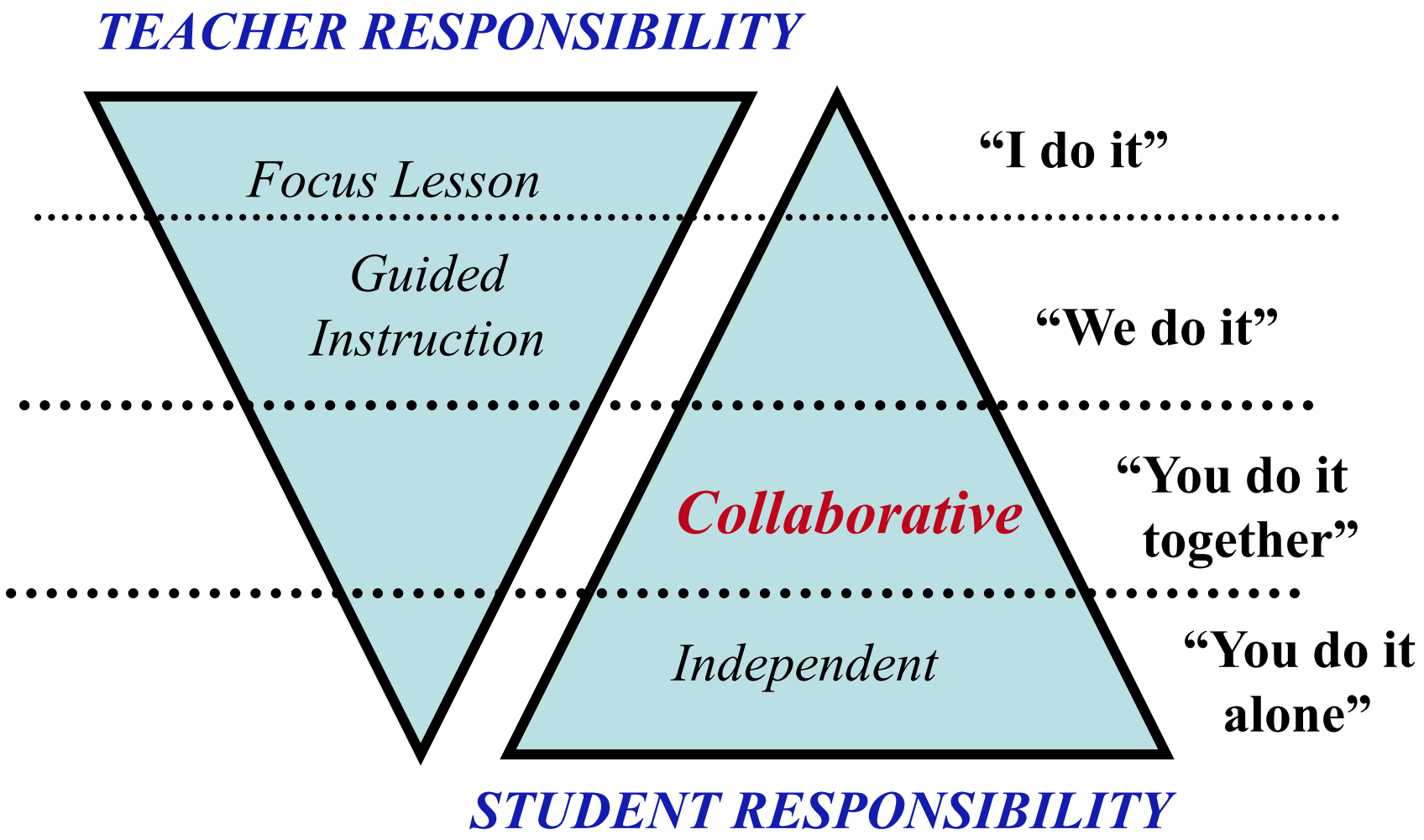
STUDENT RESPONSIBILITY

Fisher, D., & Frey, N. (2008). *Better learning through structured teaching: A framework for the gradual release of responsibility.* Alexandria, VA: Association for Supervision and Curriculum Development.

The "Good Enough" Classroom



Fisher, D., & Frey, N. (2008). *Better learning through structured teaching: A framework for the gradual release of responsibility.* Alexandria, VA: Association for Supervision and Curriculum Development.

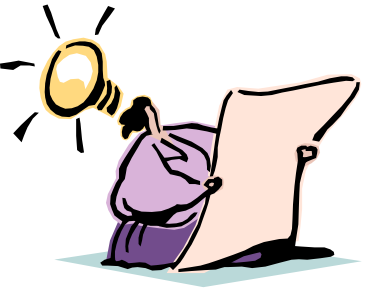


A Model for Success for All Students

Fisher, D., & Frey, N. (2008). *Better learning through structured teaching: A framework for the gradual release of responsibility.* Alexandria, VA: Association for Supervision and Curriculum Development.

The Second Idea:
Teach for interaction with you and the content.

Modeling Your Thinking



Thinking Aloud in Math

Background knowledge (e.g., When I see a triangle, I remember that the angles have to add to 180°.)

Relevant versus irrelevant information (e.g., I've read this problem twice and I know that there is information included that I don't need.)

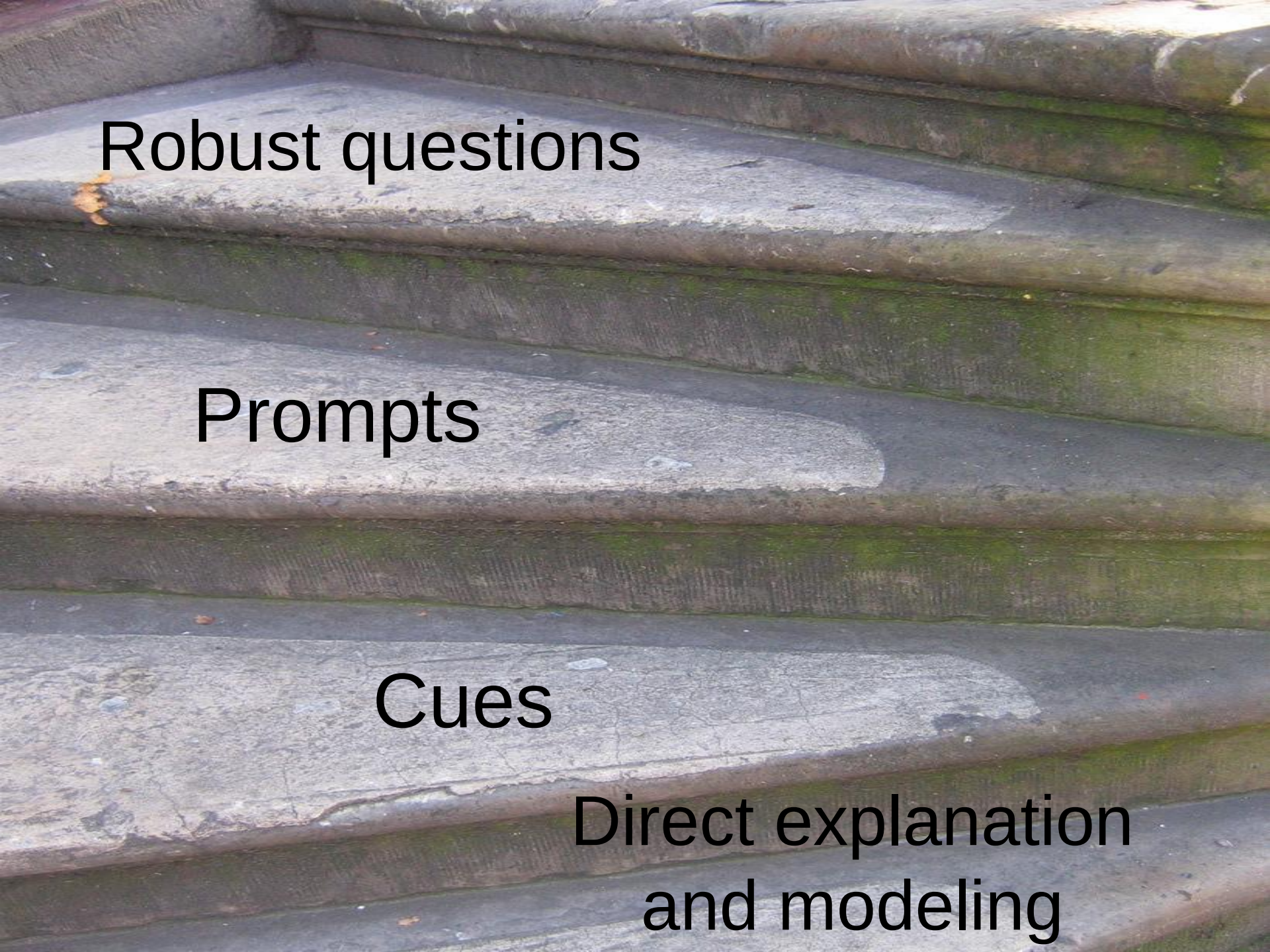
Selecting a function (e.g., The problem says 'increased by' so I know that I'll have to add.)

Setting up the problem (e.g., The first thing that I will do is … because …)

Estimating answers (e.g., I predict that the product will be about 150 because I see that there are 10 times the number.)

Determining reasonableness of an answer (e.g., I'm not done yet as I have to check to see if my answer is makes sense.)

Fisher, D., Frey, N., & Anderson, H. (2010). Thinking and comprehending in the mathematics classroom (pp. 146-159). In K. Ganske & D. Fisher (Eds.), *Comprehension across the curriculum: Perspectives and practices, K-12.* New York: Guilford.


Robust questions
Prompts
Cues
Direct explanation
and modeling

Direct Explanation

Identify

Explain

Think aloud

Monitor

Take care not to re-assume responsibility too quickly

The Third Idea: Teach for metacognition.

Making Group Work Productive

It is *not*:

- **Ability grouping**

- **For introducing *new* information or *new* skills**

Is it **sounding like** GOOD Instruction?

There is so much more…. But

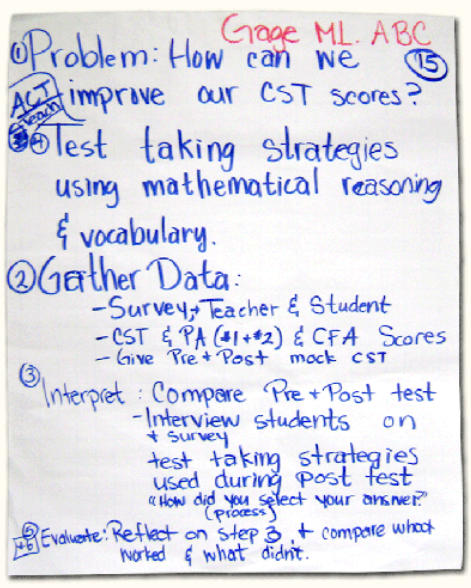
I'm out of time

Consistency Interaction Metacognition


Thanks
Thanks
Thanks
Thanks
Thanks
Thanks
Thanks
Thanks

Preparing for Success in Algebra I:
Language & Mathematics & Action Research

- Snapshot created by Sudha Venkatesan, CaMSP Grant Director, LD 6, LAUSD and Gretchen Laue, U.C. San Diego, CaMSP Grant; shared by Gretchen Laue



What's Language Got to Do With It?

Preparing for Success in Algebra
CaMSP Cohort 6

Gretchen Laue
University of California Professional Development Institute
UC San Diego
glaue@ucsd.edu

2000-2012 in LAUSD
A Journey Bringing the Teaching of Language and Mathematics Together

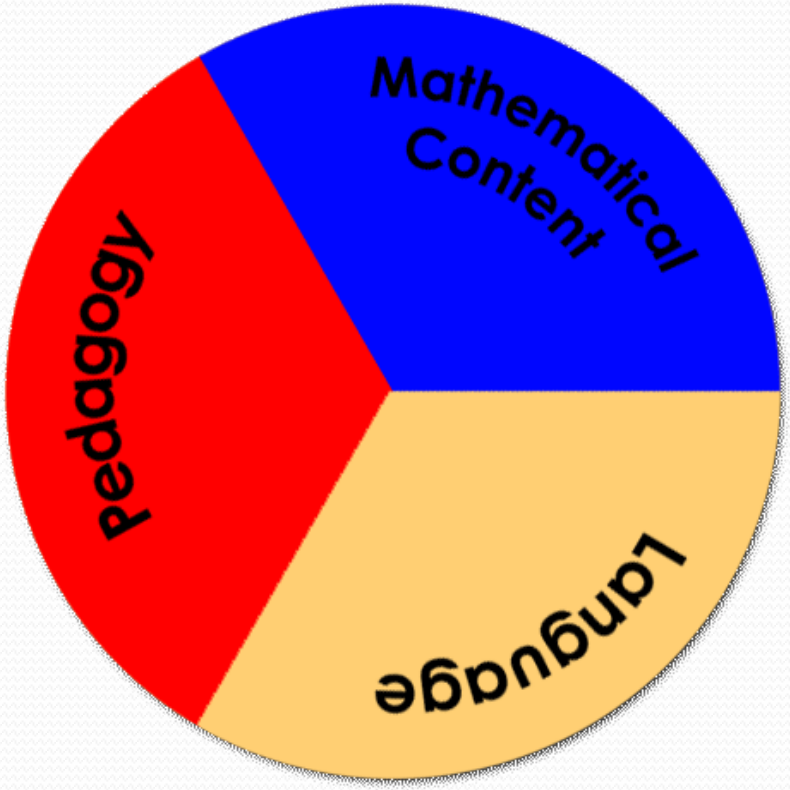
PREPARING FOR SUCCESS IN ALGEBRA
LAUSD – District 6
In partnership with UCSD, SDSU, UCI, and SDMP

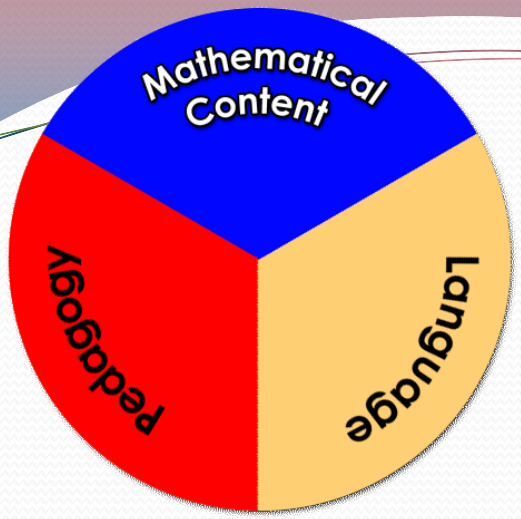
Our Approach

- English Language access
- Integrate Coherent Professional Development: Pedagogy/Mathematical Content /Language to support transition to Common Core

Example

- Reviewing the Mathematics Instructional Guide, and what was being taught we identified standards to be address
- Standard: Statistics and Probability
- Addressed in Follow-up #4





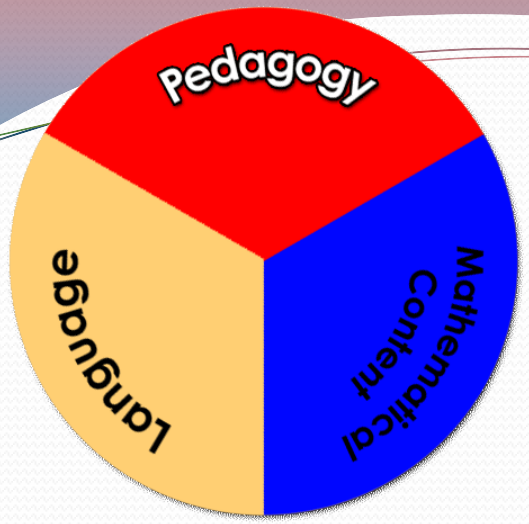
Mathematics Content

- Dr. John Elwin focused on increasing the mathematical knowledge of teachers
- Activity: Chuck-a-Luck

CaMSP Mathematical Content

Chuck-a-Luck

Trailer condensed from one hour PD session



Pedagogy

- The teacher leaders approached the material and determined how they would teach it in their classrooms
- Exercise: Colored Tiles in a Bag

CaMSP Pedagogy

12 Tiles in a Bag

Trailer condensed from one hour PD session

Language

- The innovation and heart of our work has been the focus on language.

Language Knowledge Test

- This test assesses teachers' knowledge of the Language of Mathematics and their ability to teach it to English Learners.
- We use the results of this test to tailor our PD to the specific instructional needs of the participants.
- The test has been developed by Dr. Robin Scarcella as part of our CaMSP project.

What is included in the test?

- The language of mathematics
- Effective instructional techniques
- Language differentiation by levels of English proficiency

What is a typical item?

The following items pertain to Ms. Cortinez and the language of word problems. Mr. Cortines asks his students to solve the following word problem:

Ms Jamieson the vice president of sales took a client out to lunch If the lunch was $44 and she gave a 20% tip, how much money did she spend on lunch?

A. $8.80 B. $35.20 C. $52.80 D. $53.80

Which of the language features listed in the table below will make the word problem **difficult** for Ms. Cortinez' **intermediate-level English learners** to solve?

1. the proper noun, Ms. Jamieson
   A. Yes
   B. No
   C. I'm not sure

2. the prepositional phrase *of sales*
   A. Yes
   B No
   C. I'm not sure

3. the conditional clause that begins with the word *if -If the lunch was*...
   A. Yes
   B. No
   C. I'm not sure

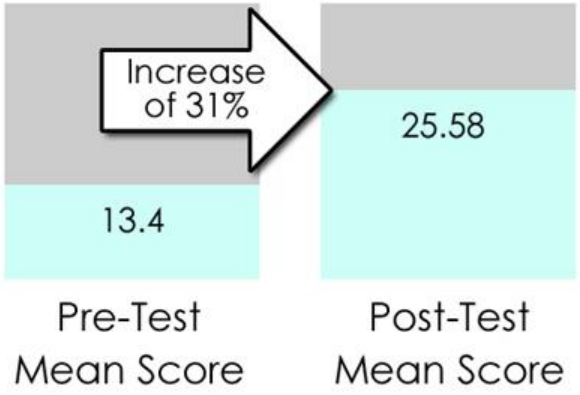
4. the word *lunch*
   A. Yes
   B. No
   C. I'm not sure

Did the scores correlate with student scores on the CST Mathematics?

- In the two years of our study, we examined whether English learners who were taught by teachers with high scores on the Test of Language performed better on the CST in Mathematics than English learners who were taught by teachers with poor scores on the Test of Teacher Knowledge of Language to English learners. There was a positive correlation.

What were the results?

Teacher Math Knowledge
Comparison of Year 1 and 2



Student Results, Scaled Score

*p≤ .001. n = 3,296

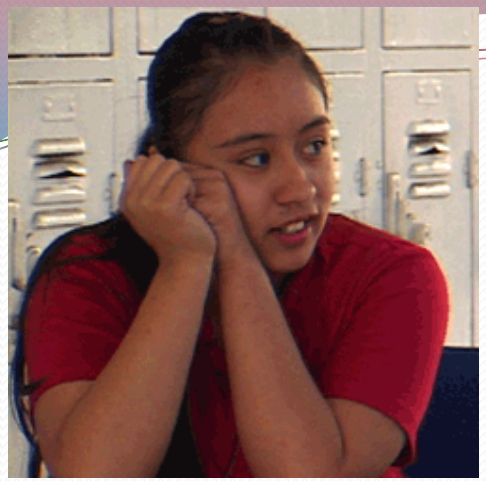
Percentile Rank, Matched

	Control	Treatment
08-09	45	45
09-10	43	46
Gain	**-2%**	**+1%****

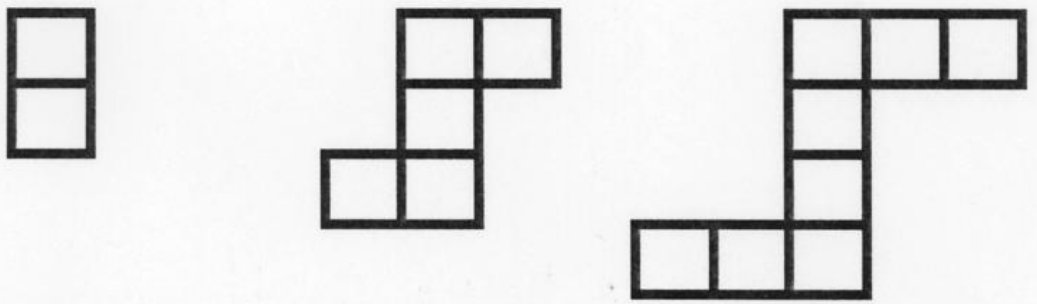
**p≤ .001. n = 3,142
Source: CaMSP Year Six Report, Public Works

- In addition to looking at teachers, we piloted a student mathematical language interview to help teachers identify student language levels of proficiency and academic language needs and support.

Student Interview



Pattern C



1. A year has 365 days, and a day has 24 hours. How many hours are in 365 days?

A 2190
B 7440
C 7679
D 8760

2. The total length of a vehicle is 205.83 inches. What is the length of the vehicle rounded to the nearest whole number?

A 200 inches
B 205 inches
C 206 inches
D 210 inches

2. The total length of a vehicle is 205.83 inches. What is the length of the vehicle rounded to the nearest whole number?

A 200 inches
B 205 inches
C 206 inches
D 210 inches

I have learned how to add two or more numbers together.
I have learned how to see a problem in sentences.
I have learned how to multiply numbers together.

I got 210 in. because the 5 is the whole number so it can make the next number bigger by one. So then I turned the 5 into a zero

Preparing for Success in Algebra
Demonstration Center

What We Offer

- Emphasis is on English learners

CaMSP Website

For Your Reference

- For further information, please contact:
  - Sudha Venkatesan at sudha.venkatesan@lausd.net
  - Gretchen Laue at glaue@ucsd.edu
  - Robin Scarcella at rcscarce@uci.edu

    -or-
  - The UC Professional Development Institute
    - phone: (858) 534-9154
    - e-mail: ucpdi@ucsd.edu
    - website: ucpdi.ucsd.edu

Team Members

- Copies of the slides for this presentation are posted on our website: www.camsp.net

Standards for Mathematical Practice & Proficiency for English Learners

- *Make sense of problems and persevere in solving them*
- *Construct viable arguments and critique the reasoning of others*
- *Read, write, and speak grounded in evidence*
- *“Staircase of (text) complexity”*

Ponderings: Panel Discussion

What are some of your thoughts around how we help our colleagues take ownership of this work, and make it meaningful in their daily practice?

Which “tools” are absolutely essential?

With Common Core on the horizon, how might this work evolve?

Q & A

Where to Find:

- "Reparable Harm: Fulfilling the Unkept Promise of Educational Opportunity for California's Long Term English Learners"

  http://www.californianstogether.org/docs/download.aspx?fileId=227

- CaMSP: Preparing for Success in Algebra I

  http://www.camsp.net

- LAUSD Mathematics
  http://www.lausd.net/math

Thank You!

Contact information:

- Roberta Ross, Huntington Park HS, LAUSD
  rlr0178@lausd.net
- Roslyn Chambers, Washington HS, LAUSD
  rchamber@lausd.net
- Odette Board, Local District 8, LAUSD
  oboard@lausd.net
- Sudha Venkatesan, Local District 6, LAUSD
  sudha.venkatesan@lausd.net
- Gretchen Laue, U.C. San Diego
  glaue@ucsd.edu
- Lisa Usher-Staats, Local District 6, LAUSD
  lisa.usher@lausd.net